REMARKS

The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Claims 1-36 are pending in this case. Claims 1-36 have been rejected under 35 U.S.C. § 102(e). Independent claims 1, 7, 13, 19, 25, 31 and dependent claims 6, 24, 26-30, 32-36 have been amended. New claims 37-64 have been added.

Revocation and Substitute Power of Attorney

A Revocation and Substitute Power of Attorney and accompanying Statement under 37 CFR 3.73(b) were previously facsimile filed by Applicant on January 13, 2004. Apparently, these papers were never entered in the records of the PTO. Copies of the papers previously submitted including a facsimile receipt from the US PTO are enclosed with this response. Applicants request they be entered and that the practitioners at Customer Number 25937 be duly appointed to prosecute this patent application.

Response to 35 U.S.C. § 102(e) Rejections

The Examiner rejected claims 1-36 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,711,297 ("Chang et al.").

Regarding independent claims 1, 7, 13 and 25:

Applicant respectfully submits that the prior art fails to disclose or suggest at least a lossless progressive image streaming system wherein the client computer generates and transmits to the server a request list containing the coordinates of data blocks required for rendering a region of interest (ROI) within the digital image, wherein the request list is ordered in accordance with a selected progressive mode. Therefore, Applicant respectfully traverses the rejections and request favorable reconsideration.

Further, Applicant has reviewed the cited art and respectfully submits that the art fails to disclose or suggest Applicant's claimed invention, and fails to teach each and every element and limitation of the claims rejected herein. Therefore Applicant respectfully traverses the rejections and requests favorable reconsideration.

While continuing to traverse the Examiner's rejections, Applicant, in order to expedite the prosecution, has chosen to clarify and emphasize the crucial distinctions between the present invention and the devices of the patents cited by the Examiner. Specifically, representative claim 1 has been amended to include a system for lossless progressive streaming of images over a communication network comprising an image storage device for storing a digital image, a client computer coupled to the communication network, wherein the client computer generates and transmits across the communication network a request list containing the coordinates of data blocks required for rendering a region of interest (ROI) within the digital image, wherein the request list is ordered in accordance with a selected progressive mode, a server computer coupled to the communication network and the image storage device, the server computer adapted to perform the steps of preprocessing the digital image through a lossless wavelet transformation, receiving the request list from the client computer and progressively transmitting to the client computer data blocks corresponding to the region of interest in the order they were requested.

Chang et al. teaches a dynamic transfer scheme for transferring data including images from a server to a client. Source data is transformed into a hierarchical representation comprising a plurality of levels of transform data, such that a level of the hierarchical representation comprises transfer data sufficient to reconstruct the source data at a resolution corresponding to the level. The server transfers transform data from a level of the hierarchical representation corresponding to the desired resolution.

It is submitted that the image transfer scheme of Chang et al. transfers data from the server to the client only in accordance with the desired resolution. The client requests physical coefficient coordinates from the server according to the desired resolution level chosen by the user.

In contrast, the lossless progressive image streaming mechanism of the present invention is operative to generate a request list at the client whereby the coordinates of the data blocks included in the request list are ordered in accordance with a selected progressive mode. The progressive mode may be either progressive by quality, progressive by resolution or progressive by spatial order. In each mode, the request list contents are ordered in a different way. Each progressive mode has advantages depending on the particular application. For example, progressive by quality is optimal when viewing in low bandwidth environments because in this mode, the subband coefficients with the largest absolute values are requested first, followed by subband coefficients with coefficients having smaller absolute values. The coefficients with larger absolute value are requested first since they represent the most visually significant data such as strong edges in the image (see paragraph

[0270]). Progressive by spatial order is optimal with, for example, a "print on demand" feature where the region of interest (ROI) is actually a low resolution "proof print" of a high resolution graphic art image. In this mode, the data blocks are ordered in top to bottom order, so that the image can be printed in parallel to its transmission (see paragraph [0255]). These features are neither taught nor suggested by Chang et al.

Regarding independent claims 19, 31 and 41:

Applicant respectfully submits that the prior art fails to disclose or suggest at least a lossless progressive image streaming system wherein the client computer generates and transmits across the communication network a request list containing the coordinates of data blocks required for rendering a region of interest (ROI) within the digital image, wherein the request list is **ordered in accordance with the absolute value of requested subband coefficients** whereby subband coefficients with larger absolute values are requested before subband coefficients with smaller absolute values. This is the progressive by quality mode of image streaming as taught by the present invention.

While continuing to traverse the Examiner's rejections, Applicant, in order to expedite the prosecution, has chosen to clarify and emphasize the crucial distinctions between the present invention and the devices of the patents cited by the Examiner. Specifically, representative claim 41 has been amended to include a method for use on a client computer for lossless progressive streaming of images from a server computer to the client computer over a communication network, the method comprising the steps of determining one or more data blocks required for rendering of a region of interest (ROI) within the digital image, generating a request list of coordinates corresponding to the data blocks, wherein the request list is ordered in accordance with the absolute value of requested subband coefficients whereby subband coefficients with larger absolute values are requested before subband coefficients with smaller absolute values, transmitting the request list to the server computer, receiving the data blocks from the server computer and rendering the region of interest utilizing the data blocks.

It is submitted that although the wavelet transform of Chang et al. does not explicitly teach a particular progressive mode, the wavelet transform of Chang et al. apparently requests subband data from the server according to resolution.

In contrast, the lossless progressive image streaming mechanism of the present invention discloses an image streaming mechanism whereby the client is adapted to request data blocks of

subband coefficient data form the server in accordance with one of several possible progressive modes. One of these modes is progressive by quality whereby the client generates a request list of coordinates corresponding to the data blocks, wherein the request list is ordered in accordance with the absolute value of requested subband coefficients whereby subband coefficients with larger absolute values are requested before subband coefficients with smaller absolute values. This feature is neither taught nor suggested by Chang et al.

Regarding new independent claim 51:

Applicant respectfully submits that the prior art fails to disclose or suggest at least a lossless progressive image streaming system wherein the server computer performs a preprocessing step whereby the original digital image is passed through a low pass filter and a lossless wavelet transform a predetermined number of times to yield low pass scaling function data, high pass wavelet coefficient data and halfbit data.

It is submitted that the wavelet transform utilized by the image transfer scheme of Chang et al. is based on lossless transforms well known in the art (see col. 8, lines 56 to col. 9, line 6).

In contrast, the lossless progressive image streaming mechanism of the present invention teaches a novel scheme whereby the server performs preprocessing on the original image in order to speed the subsequent ROI processing when requests for data blocks are later received from the client. The preprocessing step includes passing the original image through a low pass filter. The output of the low pass filter is then processed by a novel lossless wavelet transform a certain number of times. The preprocessing step yields low pass scaling function data, high pass wavelet coefficient data and halfbit data (described above). This feature is neither taught nor suggested by Chang et al.

Regarding new independent claim 52:

Applicant respectfully submits that the prior art fails to disclose or suggest at least a lossless progressive image streaming system wherein the server computer implements a lossless wavelet transform that includes the steps of (1) applying an X-direction wavelet transform to a digital image to yield a temporal matrix therefrom; (2) applying a low Y-direction wavelet transform to a low portion of the temporal matrix to yield LL and LH subband coefficients; and (3) applying a high Y-direction wavelet transform to a high portion of the temporal matrix to yield HL and HH subband coefficients including a half-bit matrix containing half-bits, each half-bit corresponding to an HH subband coefficient.

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It is submitted that the wavelet transform utilized by the image transfer scheme of Chang et al. is based on lossless transforms well known in the art (see col. 8, lines 56 to col. 9, line 6).

In contrast, the lossless progressive image streaming mechanism of the present invention teaches a novel scheme whereby the lossless wavelet transform performed by the server utilizes three different transforms: (1) a different transform for the forward X direction; (2) a different transform for the forward low Y direction; and (3) a different transform for the forward high Y direction. This feature is neither taught nor suggested by Chang et al.

In light of the arguments presented hereinabove, it is believed that amended independent claims 1, 7, 13, 19, 25 and 31 and new independent claims 41, 51 and 52 overcome the Examiner's § 102(e) rejection based on the Chang et al. reference. In addition, it is believed that dependent claims 2-6, 8-12, 14-18, 20-24, 26-30, 32-40, 42-50, 53-64 also overcome the Examiner's rejection based on § 102(e) grounds. The Examiner is respectfully requested to withdraw the rejection based on § 102(e).

New Claims

New claims 37-64 have been added. Support for the new claims may be found throughout the specification and drawings as filed in this application. In particular, reference may be made to page 3, line 29 through page 66, line 14 and the Figures references therein. No new matter has been added.

Correction of Typographical Errors

Amendments haven been made to correct numerous grammatical and usage errors in the specification. No new matter has been added to the application by these amendments.

Conclusion

In view of the above amendments and remarks, it is respectfully submitted that independent claims 1, 7, 13, 19, 25, 31, 41, 51, 52 and hence dependent claims 2-6, 8-12, 14-18, 20-24, 26-30, 32-40, 42-50, 53-64 are now in condition for allowance. Prompt notice of allowance is respectfully solicited.

In light of the Amendments and the arguments set forth above, Applicant earnestly believes that they are entitled to a letters patent, and respectively solicit the Examiner to expedite prosecution

of this patent applications to issuance. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

Customer Number: 25937

Respectfully submitted,

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